

Centigrade through very finely ground coffee in a [metallic] permanent filter pan, usually a metallic filter pan, using a driving pressure of 3 bar to 15 bar. Examples of espresso-type coffee makers are described and depicted in U.S. Pat. Nos. 5,280,747; 5,392,694; 4,882,982; and 5,150,645. Current technology in espresso filtration provides for a finely fenestrated [metallic] permanent filter, which is typically metallic, on top of which are situated coffee grounds, 0.3 millimeters [in size] or less in ([particle size]). This [metallic] permanent filter functions to intercept most of the coffee grounds while allowing the liquid coffee beverage along with its oils and some fine particulate grounds to pass into the awaiting cup. Although such filtration of particulate matter (grounds), until presently, has been considered "state of the art" world-wide, recent proof that the lipid fraction (coffee oils) as well as the fine particulate coffee grounds which escape filtration in this previously described system, are indeed harmful to the human organism, has come to light. The compounds cafestol and kahweol[,] ([here] herein "C" and "K") present in the coffee oils in the fine particulate coffee grounds (both of which escape [metallic] permanent filtration; see above) have been extensively studied by medical researchers and have been conclusively shown to substantially elevate serum[,] cholesterol, triglycerides, and liver function tests. See, for example, P. Zock, M. B. Katan, M. P. Merkus, et al., *Effect of a Lipid-Rich Fraction from Boiled Coffee on Serum Cholesterol*, Lancet 1990; 335:1235-7; H. Heckers, U. Gobel & U. Kleppel, *End of the Coffee Mystery: Diterpene Alcohols Raise Serum Low-Density Lipoprotein Cholesterol and Triglyceride Levels*, Journal of Internal Medicine, (J. Int. Med.) 1994; 235:192-3; R. Urgert, A. G. M. Schultz & M. B. Katan, *Effects of Cafestol and Kahweol from Coffee [Ground Son Serm] Grounds on Serum Lipids and Serum Liver Enzymes in Humans*, American Journal of Clinical Nutrition (AM. J. Clin. Nutr.) 1995; 61:149-54; W. Weusten-Van Der [Woy] Wouw, et al., *Identity of the Cholesterol-Raising Factor from Boiled Coffee and its Effects on Liver Functions Enzymes*, Journal of Lipid Research (J. Lipid[.] Res.) 1994; 35:721-33; E. Arnesen, N. E. Huseby, T. Brenn & K. Try, *The Tromso Heart Study, Distribution of, and Determinants for, Gamma-Glutamyl Transferase in a free Living Population*, Scandinavian Journal of Clinical Laboratory Investigation, (Scand. J. Clin. Lab. Invest.) 1986; 46:63-70; O. [Nelssen] Nilssen, D. H. Forde, & T. Brenn, *The Tromso Study. Distribution and Population Determinates of Gamma-Glutamyl Transferase*, American Journal of Epidemiology (AM. J. Epidemiol.) 1990; 132:318-26; *Ulmann's Encyclopedia of Industrial Chemistry-5th Edition*, 1986; Vol. A7:pg. 334; M. Van Desselorp, et al., *Cholesterol-Raising Factor from Boiled Coffee does not Pass a Paper Filter*, Arteriosclerosis and Thrombosis 1991; 11:586-93.

Please amend the paragraph beginning at column 1, line 62, as follows:

B3 About 18% of Arabic coffee (bean) is lipid (oil). Of that 18%, 20% is composed of fatty acid esters of the diterpene alcohols known as cafestol and kahweol [(herein "C" and "K")]. The aforementioned Zock, et al. article showed that the lipid (oil) rich floating on the surface of boiled coffee raised the serum LDL-C cholesterol and serum triglycerides (both atherogenic) by 29% and 55% respectively. The aforementioned Heckers, et al. article found that subjects given 148 mg of C and K daily for one month had a 50% increase in serum LDL-C and an 87% increase in serum triglycerides. One double espresso (approximately 30 cc) can contain up to 24 mg of C and K in a single cup. [[Furthermore, the espresso brewing method was shown by Urgert, et al.] al. in the *Journal of Agricultural and Food Chemistry*, August 1995 to be the most effective at extracting the harmful compounds C and K, when compared to other brewing methods, i.e. drip vs. boil vs. percolation[, etc.]] and the like.

Please amend the paragraph beginning at column 2, line 12, as follows:

B4 The previously cited article by Urgert, et al. confirms [the above] these results, but the studies there described are based on the C and K found in the particulate grounds found at the bottom of the coffee cup. The particulate grounds which escaped filtration were found to be potent carriers of C and K and in addition to raising cholesterol and triglycerides C and K were found to elevate liver enzymes serum ALT (alanine aminotransferase) and serum AST (aspartate aminotransferase) to a lesser extent. These liver enzymes, when elevated, can indicate hepatocellular (liver) disfunction and/or damage. Other researchers confirmed the adverse effects of C and K on [the] liver function [tests]. See, for example, the [aforecited] Urgert, et al., Weusten-Van Der Wouw, et al., [Amesen] Arnesen, et al.] al. and Nilssen, et al.] al. references cited above.

Please amend the paragraph beginning at column 2, line 26, as follows:

B5 This [assemblage of] evidence clearly establishes the need for a filter which can [rid an espresso coffee beverage of its] reduce the harmful oils and unfiltered grounds present in an espresso coffee beverage, which is what the [present] invention can accomplish.

Please amend the paragraph beginning at column 2, line 30, as follows:

B6
It has been discovered that paper coffee filters can remove substantially the C and K in coffee beverages by filtering both the oils and small particulate grounds which have been found to [house] contain C and K. See the [aforecited] Urgert, et [aL.] al. [paper] and [the article by] Van Desseldorp, et [aL.] al. papers cited above. Prior to the [present] invention, paper filters have not been developed for espresso-type coffee makers since [it would appear] they appeared to be redundant to the metallic or other permanent filter, or it was felt paper filters were unsuitable for use.

Please amend the paragraph beginning at column 2, line 40, as follows:

B7
A principal feature of the [present] invention is the precision of an improved filtering device for an espresso-type coffee maker.

Please amend the paragraph beginning at column 2, line 43, as follows:

B8
The espresso-type coffee maker is of the type having a spout to deliver heated water under pressure, and a receptacle to receive the brewed filtered coffee. The filtering device has a [metallic] permanent filter in the path of heated coffee passing to the receptacle. In accordance with the [present] invention, filter paper is provided in the flow path of the liquid brewed coffee which removes a substantial part of the coffee oils and particulate grounds which escape [metallic filtration] the permanent filter. These substances [house the] contain cafestol and kahweol [previously discussed] and thus, these undesirable substances are, at least partly, removed from the brewed coffee liquid.

Please amend the paragraph beginning at column 2, line 54, as follows:

B9
Thus, one advantage of the invention is that the filtering device [of the present invention] substantially prevents, in the consumers of its treated coffee, the raising of serum LDL cholesterol, liver enzymes (ALT), and triglycerides, all of which are potentially dangerous [perturbations].

Please amend the paragraph beginning at column 2, line 59, as follows:

B10 Yet[,] another advantage of the invention is that [the] removal of the frequently rancid, bitter coffee oils and grounds can improve the flavor of the coffee beverage.

Please amend the paragraph beginning at column 3, line 20, as follows:

B11 FIG. 1 is an elevational view, partly in section, of an espresso-type coffee maker incorporating the [principals] principles of the [present] invention.

Please amend the paragraph beginning at column 3, line 23, as follows:

B12 FIG. 2 is a perspective view of one part of the apparatus of FIG. 1, namely a disposable filter made in accordance with the [principals] principles of the [present] invention.

Please amend the paragraph beginning at column 3, line 34, as follows:

B13 Referring [now] to FIG. 1, there is shown an espresso-type coffee maker, generally designated 9, with a filtering device, generally designated 10. The coffee maker 9 is of the type which delivers hot water under pressure to spouts 12, after which the heated water passes through ground coffee beans CG in the filtering device to a receptacle 14, such as a cup, which receives the heated coffee.

Please amend the paragraph beginning at column 3, line 41, as follows:

B14 The filtering device 10 has a holding pan 16, which receives a permanent filter, such as a perforated metallic filter 18 of known type in espresso-type coffee makers. The holding pan 16 may have a rubber O-ring 20 to sealingly engage against an outer surface of the metallic filter 18 and ensure that the hot water is pumped through the coffee CG and [filters] filter under pressure.

Please amend the paragraph beginning at column 3, line 47, as follows:

B15
The holding pan 16[,] has a [conic] conical chamber 22 beneath the metallic filter 18 which communicates with a passageway 26[, then to a] leading to the receptacle 14. [In accordance with the present invention, a] A paper filter 30 is removably placed on top of the metallic filter 18 ["sandwiched"] between the coffee grounds CG and the metallic filter 18. The paper filter may be of the type sold under the trademark MR. COFFEE for conventional (non-pressurized) type coffee makers, and the filters may be cut to size to fit the base of the metallic filter 18. In a preferred form, the filter 30 may be made of a plurality of layers of the paper layers such as the two layers 31, 32 shown in FIG. 3, each of which [layer is of the] has a conventional thickness for non-espresso coffee filters. These layers are crimped together about their perimeter as indicated at [the number] 34. This forms an easily handled, disposable, multi-layer filtering unit. Thus, the coffee grounds CG are filtered by the metallic filter 18, and the brewed coffee is also filtered by the paper filter 30 to remove harmful lipids and coffee grounds which may effect a rise in the cholesterol levels in a user of the brewed coffee. The modified paper filter 30 [of the type sold under the trademark are] is preferably placed directly on the metallic filter 18, and the ground coffee beans CG are placed directly onto the paper filter.

Please amend the paragraph beginning at column 4, line 3, as follows:

B16
A prototype of the filtering device [of the present invention] was constructed, tested, and shown to be effective. The prototype was sized and shaped to fit the espresso holding pan of a Rancilio brand machine, Model No. MISS 935624, made by Rancilio of Italy. Thus, it was approximately circular in shape with a diameter of approximately 5 cm (which, of course, can be custom made to fit any size holding pan) and [comprised] was formed of two layers of standard filter paper derived from filters of the cone variety. It was, as a consequence, twice the standard thickness of conventional coffee filters.

Please amend the paragraph beginning at column 4, line 14, as follows:

B17
Some tests were made on the filtering device 10 as follows. First, in order to determine the amount of oil in the coffee brewed without use of the paper filter, some coffee was brewed and allowed to chill in a refrigerator for [2-3] two to three hours in order to allow the oils to get on the surface of the liquid air interface. Copious quantities of lipids were